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IS THE DAY OF THE
AIRCRAFT CARRIER OVER?

by

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Joint Vision 2010 raises the question of aircraft carrier viability in the 21st Century. The aircraft carrier has often come under scrutiny by other services and civilian leadership, usually in times of fiscal belt-tightening. Joint Vision 2010 ?Concept for Future Joint Operations provides the thesis for this project and the question is characteristic of its ideology. I will address this ongoing debate by demonstrating how the aircraft carrier has historically survived repeated political attack. This paper will document some of these political events including historical aircraft carrier responses to global crises, examine previously unsuccessful attempts at replacing aircraft carriers with different weapon systems and explore aircraft carrier survivability and adaptability. Further, these arguments will recall the coincidental failures or shortcomings of different forms of military applications to these historical political situations. Some theorists replied to this prospect with the claim of ?virtual presence? through the ?global reach? of air assets based within the United States. I believe that this virtual presence theory is in reality ?actual absence? and I have chosen to pursue a historical approach to disprove the concept. My discussion of responses to global crises will show how aircraft carriers have been used to quell minor crises simply through their presence as well as how they have been employed in wartime as the primary supplier of air power to theater commanders. The aircraft carrier has answered the nation?s call an average of four times a year in response to contingency and limited war operations since World War II; there is no evidence to suspect that this trend will decrease in the foreseeable future.

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Abstract

Joint Vision 2010 raises the question of aircraft carrier viability in the 21st Century. The aircraft carrier has often come under scrutiny by other services and civilian leadership, usually in times of fiscal belt-tightening. *Joint Vision 2010 —Concept for Future Joint Operations* provides the thesis for this project and the question is characteristic of its ideology.

I will address this ongoing debate by demonstrating how the aircraft carrier has historically survived repeated political attack. This paper will document some of these political events including historical aircraft carrier responses to global crises, examine previously unsuccessful attempts at replacing aircraft carriers with different weapon systems and explore aircraft carrier survivability and adaptability. Further, these arguments will recall the coincidental failures or shortcomings of different forms of military applications to these historical political situations.

Some theorists replied to this prospect with the claim of “virtual presence” through the “global reach” of air assets based within the United States. I believe that this virtual presence theory is in reality “actual absence” and I have chosen to pursue a historical approach to disprove the concept.

My discussion of responses to global crises will show how aircraft carriers have been used to quell minor crises simply through their presence as well as how they have been employed in wartime as the primary supplier of air power to theater commanders. The

aircraft carrier has answered the nation's call an average of four times a year in response to contingency and limited war operations since World War II; there is no evidence to suspect that this trend will decrease in the foreseeable future.

Chapter 1

The Political Survival of the Aircraft Carrier

The aircraft carrier is a sitting duck in modern warfare and costs the equivalent of a bomber wing.

—An unnamed Pentagon source

As military budget debates rise in intensity an anonymous version of this statement appears annually in the media and other sources of interest to the government.

A much more common, if less quoted, statement is the question “Where is the nearest carrier?” Although there are rarely media members present in the Oval Office to record this query for the evening news, it has been asked over 200 times by every American president since Harry S. Truman took office.¹ When a political crisis erupts in some distant corner of the world, America’s leadership unfailingly turns to its military weapon system that has proven consistently capable of combining devastating firepower and sustained forward presence.

The aircraft carrier and its accompanying battle group have been this nation’s only rapidly deployable provider of offshore deterrence since World War II. When Iraq most recently defied the United Nations in the autumn of 1997, the President sought immediately increased military presence in the Arabian Gulf. The U.S.S. *Nimitz* and U.S.S. *George Washington* aircraft carrier battle groups were only days away and rapidly proceeded to the troubled area. After weeks of negotiations by the Secretary of State with

various regional heads of state, landing rights and over flight clearances were eventually obtained and expeditionary forces of the Air Force began their deployment to the region over one month after the arrival of the two aircraft carrier battle group forces.

Four months after the current crisis began, land based forces continued to send incremental forces to the gulf region—but they still did not have host nation permission to conduct any offensive actions against Iraq. Much notice has been given to the Air Force assets that have deployed to the region, but little has been realized in making those forces a genuine threat to the Iraqi leadership.

Meanwhile, the U.S.S. *Independence* and her battle group, to permit *Nimitz* to end her normal six-month deployment as scheduled, had quietly relieved the *Nimitz* battle group.

The two carrier battle groups and their supporting surface ships are currently available to enforce our national will. Operating in international waters and able to conduct offensive air operations without the approval or support of host nations, the carrier forces continue to maintain their indefinite presence in the gulf.

Is the day of the aircraft carrier over?

The aircraft carrier has often come under scrutiny by other services and civilian leadership, usually in times of fiscal belt-tightening. The Joint Chiefs of Staff publication *Joint Vision 2010 (JV 2010)* and today's uncertain fiscal future have again brought the carrier under the “bean counter’s” knife as being too costly and tactically vulnerable.

I will address this ongoing debate by demonstrating how the aircraft carrier has historically survived repeated political attack. This paper will document some of these political events including historical aircraft carrier responses to global crises, examine

previously unsuccessful attempts at replacing aircraft carriers with different weapon systems and explore aircraft carrier survivability and adaptability. Further, these arguments will recall the coincidental failures or shortcomings of different forms of military applications to these historical political situations.

Joint Vision 2010 —Concept for Future Joint Operations provides the thesis for this project and the question is characteristic of its ideology. In *JV 2010*, the Joint Chiefs of Staff encourage revolutionary military planning and thought for meeting future military requirements into the next century. The *JV 2010* authors at the Joint War Fighting Center have therefore proposed that the carrier might be replaced by newer technology in the next century. Some theorists, such as former Air Force Chief of Staff Merrill McPeak, contend that maintaining visibility does not require a forward presence; they believe the “virtual presence” of a deadly force such as intercontinental bombers reflects the same political will as a deployed and on site lethal force.²

Others contend that the lack of a forward presence translates into “actual absence” in the hearts and minds of those who we wish to influence. Vice Admiral Thomas Fargo, speaking of forward-deployed carriers while Commander of the Fifth Fleet said, “Presence and deterrence are about being visible to both friend and foe —here for peace, yet ready and able to support our friends.”³

The history of our last fifty years has tested both sides of the coin on several occasions. Invariably, when relying upon weapon systems that were attempting to substitute for the carrier role, those replacement systems have failed to deliver as advertised. Often, carrier forces had to then become involved to salvage the situation.

The magnificent performance of the Air Force during Operation Desert Storm has no parallel in modern history. Their accomplishments over Iraq and Kuwait, with the help of the other coalition forces, were nothing less than remarkable.

The methodology employed to allow the unprecedented success of the air campaign in the Gulf War required some support functions that our 21st Century Strategy needs to consider. Can U.S. strategy rely on acquiring the international cooperation attained in Operations Desert Shield and Desert Storm? Will there always be a six-month build up period allowed by our future enemies during the next conflict? Can we always depend upon having amicable host nations that are prepared to receive foreign armies?

One of our long time allies in the Middle East—Iran—became one of America’s fiercest antagonists practically overnight during the Carter Administration. The “Evil Empire” of the Soviet Union, our greatest adversary during the protracted Cold War, is now our ally in free enterprise.

We can no longer blindly assume that we will enjoy international support in future conflicts. Our long lost facilities in Libya, Vietnam, Thailand, the Philippine Islands lay as mute testimony to the fallacy of relying on host nation cooperation in support of our national objectives.

Notes

¹ James M. Durham. *Carrier TACAIR 2010*. p. ii

² Robert F Johnson. *Proceedings* (August, 1996). *Carriers are Forward Presence*. p. 39

³ Robert F Johnson. *Naval Aviation News* (January-February, 1997). *Carriers are Forward Presence*. p. 33

Chapter 2

Crisis Response

Forward Presence demonstrates U.S. commitment, strengthens deterrence, and facilitates transition from peace to war.... Because of their limited footprint, strategic agility, calculated ambiguity of intent, and major strategic and operational deterrent capability, naval forces are invaluable. Our ability to rapidly move these forces in 1993 and again in 1994 from the Mediterranean Sea and the Arabian Gulf to positions off the coast of Somalia and Kuwait demonstrates extraordinary utility and versatility... the carrier battle group, in particular, has been an unmistakable sign of U.S. commitment and resolve in the Central Region.

—General Binford Peay, U.S. Army, CINC, U.S. Central Command¹

Historical responses to global crises have been a continuing source of employment for aircraft carriers for decades. There are literally hundreds of examples of carriers responding to world crises; the following is merely a brief accounting of the more famous instances that are applicable to our future.

Carriers have been used to quell minor crises simply through their presence, through limited use of military force and they have served in wartime as the primary supplier of air power to theater commanders. The aircraft carrier has answered the nation's call on average four times a year in response to contingency and limited war operations since World War II; there is no evidence to suspect that this trend will decrease in the foreseeable future.

As the Korean War began in June 1950, there was initially a concern that the Chinese Communist forces and Formosa's Nationalist Chinese forces might take advantage of the

distraction and attack one another. The Commander Naval Forces, Far East, Vice Admiral C. Turner Joy issued an order to his command directing support to Republic of Korea Forces and additionally tasking 7th Fleet to prevent hostilities from erupting between the Chinese. In an operation that would be duplicated decades later, Task Force 77's U.S.S. *Valley Forge* (CV-45) and her escorts steamed through the Formosa Strait while conducting flight operations. Once the desired effect was attained, the Task Force continued north and in three days was launching air strikes into Korea.²

Six years later Egyptian President Nasser nationalized the Suez Canal. In the fall of 1956 Israel invaded the Sinai while Britain and France began air strikes to initiate retaking the strategic canal. The 6th Fleet's *Coral Sea* (CVA-43) and *Randolph* (CVA-15) immediately responded and assisted in the evacuation of U.S. nationals from Israel and Egypt.

The stakes changed dramatically when the Soviet-armed Egyptians faired poorly on the battlefield; Soviet threats of interdiction alarmed President Eisenhower and his concern resulted in two more carriers, the *Forrestal* (CVA-59) and *Franklin D. Roosevelt* (CVA-42) arriving in the area, doubling the American show of force. Soviet threats rapidly subsided and UN buffer forces were allowed to separate the warring forces.³

The Cuban Missile Crisis of October 1962 quickly brought the *Independence* (CVA-62) and the first nuclear powered aircraft carrier, the *Enterprise* (CVA-65) to Cuban waters.⁴ While awaiting orders to launch air strikes if the need arose, Task Force 135 patrolled the area, enforcing the Cuban Quarantine with air and surface units and providing low-level reconnaissance with RF-8 *Crusaders*.

1985's Achille Lauro incident offers a classic account of naval aviation flexibility that could not be duplicated by only CONUS^α based aviation assets or surface missile ships. Knowing only approximately when escaping the terrorists responsible for the atrocities would be fleeing from Egypt, the *Saratoga* (CV-60) battle group lay quietly in wait in the Mediterranean Sea. After three fruitless night intercepts were flown against suspicious aircraft leaving Egypt, the fourth attempt identified the terrorist's airliner by its tail number. The interceptors were then able to "convince the 737 to land at the NATO base in Sigonella, Sicily."⁵

General Schwarzkopf credited the *Independence* (CV-62) and her battle group as a primary reason that prevented Saddam Hussein from attacking the Rapid Deployment Force during the build up of Desert Shield in the fall of 1990. Prior to achieving the force required to carry out Operation Desert Storm, the offshore presence of the carrier provided for the bulk of the defensive firepower protecting the U. S. forces ashore.

Following the Gulf War, several carrier battle groups participated in a wide variety of United Nation peacekeeping missions. Operations Provide Comfort and Southern Watch over Iraq were supported from both the Persian Gulf and the Mediterranean in 1991. Early 1992 found the *Saratoga* (CV-60) establishing another no fly zone, this time over Bosnia-Herzegovina as part of Operation Deny Flight. Carrier battle groups continued to provide relief and food drops to Bosnians through 1995 as part of Operations Provide Promise and Sharp Guard.⁶

Also in 1992 the *Kitty Hawk* (CV-63), while participating in Operation Southern Watch, was tasked with joining a combined air strike into Iraqi command and control facilities in response to a no fly zone violation. Meanwhile, off the African continent, the

Ranger (CV-61) provided cover for the initial insertion of UN and U.S. troops into Somalia.

When conditions worsened in Somalia in 1993, the *Abraham Lincoln* (CVN-72) appeared off the coast after completion of her Southern Watch commitment. Once complete with operations over Bosnia, the *America* (CV-66) relieved *Lincoln* until tensions calmed in the region.

Korea became more unstable than usual in the summer of 1994, but this time no carriers were deployed to the region under the assumption that adequate U.S. forces were ashore there and in Japan. Anticipating the requirement for reinforcement if hostilities occurred, four carriers were put on a two-week tether to guarantee the arrival of 248 strike aircraft if escalation occurred.⁷ This allowed the four carriers to be employed elsewhere with a guaranteed response still being available to the theater commander.

Operation Restore Democracy came into being in 1994 as well, notably marking the use of the *America* and *Eisenhower* (CVN-69) in Haiti as joint support platforms. Without an air threat in the region, it was decided to employ the carriers as transports of Army aircraft and troops to the troubled island.⁸ Freed from reliance upon strategic airlift, the Army forces also now had a base of operation available that wasn't dependent on host nation compliance.

Troop movements in Iraq again resulted in a carrier response in October of that year. Instead of deploying to the Persian Gulf, the *George Washington* (CVN-73) supported Operation Vigilant Warrior from the Red Sea. Iraqi tensions arose again in 1995, causing both the *Lincoln* and the *Independence* to respond to Operation Vigilant Sentinel in addition to their Southern Watch duties.⁹ It was ultimately decided to retaliate by using

the *Lincoln* battle group surface combatant's cruise missile capability, which kept American Naval Aviators and Aircrew out of potential danger.

That same year, *Theodore Roosevelt* (CVN-71) and *America* again returned to Bosnia, helping to bring a fragile peace through Operation Deliberate Force. When the Italian government refused to allow F-117 deployment into their country to support Deliberate Force, reliance upon seaborne Naval Aviation became critical.¹⁰ The Dayton Accord followed, as did the insertion of UN peacekeeping troops —with air cover provided by the *America*.¹¹

The China and Formosa standoff of 1996, brought to a head through well-advertised Chinese military exercises, resulted in an American show of force and resolve similar to that provided in 1950 by the *Valley Forge*. Initially the *Independence* was sortied to the area while it was announced that *Nimitz* (CVN-68) was enroute from the Persian Gulf.¹² Although *Nimitz* did not actually arrive until the *Independence* had departed the region, the media and others were convinced that it had been the entire time; the carrier-duo threat was noted by the region's adversaries, who promptly ceased carrying out their announced intentions.

Iraqi actions in 1996 once again resulted in retaliatory strikes against its infrastructure. This time the “Global Reach” theory was tested by using B-52 Stratofortresses to deliver air-launched cruise missiles. Operation Desert Strike could not provide for globe-girdling Air Force fighter escort of the bomber force, so the locally deployed *Carl Vinson* (CVN-70) provided fighter support through the troubled airspace.¹³

The *Vinson* battle group surface combatants were also quite capable of launching the same cruise missile attack as the B-52s, just as the *Lincoln*'s cruisers had done the year

before. Why the decision was made to fly bombers around the world and into harm's way, instead of using assets readily available in theatre, is open for speculation. During the 1995 cruise missile attack, Marine Corps General Joseph P. Hoar had been at the helm of Central Command. He later reflected, "When CinCs get together to discuss what we ought to be sharing among ourselves, we don't argue about submarines and bombers.... We argue about carriers and amphibs. We need them out front."¹⁴

Notes

¹ Johnson. *Proceedings* (August, 1996). p. 37

² Jeffrey G. Barlow *Naval Aviation News* (January-February, 1997). *Answering the Call: Carriers in Crises Response since World War II.* p. 16

³ ibid. p. 17

⁴ ibid. p. 18

⁵ ^a Continental United States

⁶ ibid. p. 19

⁶ Mark T. Vanderberg *Naval Aviation News* (January-February, 1997). *Responding to Crises in the New World Order.* p. 22

⁷ ibid. p. 23

⁸ ibid.

⁹ ibid.

¹⁰ Johnson. *Proceedings* (August, 1996). p. 37

¹¹ Vanderberg. p. 23

¹² ibid.

¹³ ibid.

¹⁴ Johnson. *Proceedings* (August, 1996). p. 39

Chapter 3

The Original Super Carrier

One of the real difficulties is becoming more manifest every day: the gap in the Air Force of wise and experienced leadership in the upper ranks.

—Secretary of Defense James V. Forrestal, 1947¹

The funded and under construction CVB-X design was to be the original “Super Carrier;” its displacement approached the size of the *Nimitz* class carrier as construction began in 1949.² On her giant keel, the largest ever laid to that date, was stamped “U.S.S. United States (CVA-58).” In the first major Department of Defense inter-service skirmish, the Navy’s senior leadership took drastic and career-ending political steps in their failed attempt to keep the CVB-X program alive. The debate centered over a problem that continues to resurface occasionally between the Navy and the Air Force — duplication of missions. Revolving around the role of the Air Force’s new B-36 intercontinental bomber, this political clash argued that the CVB-X concept was simply a duplication of the Air Force’s strategic nuclear weapon delivery mission.

The CVB-X and the B-36 were both approved and funded —their mutual co-existence was not an issue until the services chose to make it one. Parochial concerns over whether the CVB-X would duplicate the Peacemaker’s nuclear mission were brought to the attention of newly appointed Secretary of Defense Louis Johnson by the Air Force Chief of Staff, General Hoyt Vandenberg in 1949. General Vandenberg

possessed a 1947 point paper, not meant for release outside Navy circles, called the “Gallery Memorandum.” Written by Admiral Dan Gallery (the same officer that captured the U-505 in the Atlantic while commanding a Hunter-Killer carrier force in World War II), the memorandum was certainly not the official stance taken by the Navy. This paper nevertheless represented the view of much of Naval Aviation’s leadership and was perceived by the Air Force to threaten that two year-old service’s very existence. Some within the upper ranks of Navy leadership were concerned that the fledgling Air Force would usurp the Navy’s aviation role and, in particular, its carriers. Hard lines were drawn in the sand with the exposed memorandum’s conclusion of “the major missions of the Navy and Air Force should be as follows:

Navy: The delivery of an atomic attack on the capitol and industrial centers of the enemy. Secondary mission: Control of the seas.

Air Force: The defense of the United States against air attack. Secondary mission: The delivery of atomic attacks from overseas bases.”³

The original Secretary of Defense, James Forrestal, was instrumental in CVB-X development and his thoughts lend a unique view into the brewing controversy. In 1947 he wrote of the “[immaturity of the officers who had been brought to high command by the spectacular development of the Air Force]. ‘One of the real difficulties is becoming more manifest every day: the gap in the Air Force of wise and experienced leadership in the upper ranks.’”⁴

Forrestal’s untimely death that year brought in a new Secretary of Defense, one with an entirely different agenda. Although Forrestal was obviously navy-biased, his wartime experiences as Secretary of the Navy gave him an experienced war-fighting perspective. His military knowledge and insight give his arguments a warrior’s credibility; his replacement chose to abandon that philosophy. Forrestal had questioned Secretary of the

Air Force Stuart Symington's motivations long before the debate began.⁵ Secretary of Defense Johnson, concerned more with cost-cutting and political budgetary than with national defense, proved all too willing to listen to Symington's argument because they supported the "interests of the administration and his own political future."⁶

The Chief of Naval Operations, Admiral Louis Denfield, delivered the official Navy stance. His letter to Johnson instead made the case that the carrier should be used for strategic targets limited to "naval operations or war at sea."⁷ The attempt was poorly made by the Navy to dispel the myth that it wanted to replace the fledgling Air Force's role.

Encouraged by the president's military advisor and effectively the acting Chairman of the Joint Chiefs of Staff, General of the Army Dwight D. Eisenhower —who would soon change his mind about the importance of aircraft carriers —Secretary Johnson cancelled the *United States*.⁸ Johnson did so without even discussing the issue with the Secretary of the Navy, John L. Sullivan, who resigned in protest.⁹ Noted military historian Walter Millis wrote sadly of the replacement Secretary's actions:

This was a reckless destruction of the extremely delicate balances which his predecessor [Forrestal] had been at such pains to establish. Secretary Johnson may have felt that he had logic on his side, but military growth and development are not logical processes. Soldiers, no less than lawyers, priests or doctors, are human; and the great institutions over which they all preside are organic rather than mechanical growths. Forrestal sensed this fact; Johnson scorned it and the immediate result was the envenomed 'B-36 controversy' between the Navy and the Air Force, with the former retaliating for the loss of its supercarrier by assailing the latter's newest superbomber as a failure.¹⁰

In the following months the famous "Revolt of the Admirals" ensued and great scrutiny was brought upon the B-36 program. Public challenges of using Navy jet fighters in air intercept trials of the B-36 were refused by the Air Force. The

announcement of the arrival of the MiG-15, which grossly out performed the B-36 and screamed its obsolescence, was made shortly after the B-36 was selected as the nation's primary nuclear deterrent. The miserable performance of the B-36 even caused retired SAC Commander General George C. Kenney to recommend their use in a tanker or anti-submarine role instead of as intercontinental bomber.¹¹ The B-36 never did see combat in any capacity and was soon replaced by more reputable jet aircraft.

The controversy eventually quieted after formal congressional hearings into the Convair B-36's acquisition could find no wrongdoing. The same hearings also cleared Secretary Johnson, who was a former director of the Convair company.¹²

The decision to cancel CVA-58, because of the perceived nuclear delivery duplication, had deep reaching effects in Naval Aviation. Fortunately, the funding for the *United States* was in turn reapportioned to improve and modify existing carriers as the Navy entered the jet age. This would soon prove vital as tensions in Korea mounted.

Despite the CVB-X cancellation, the Navy was still burdened with a nuclear delivery mission. That mission and the introduction of jet aircraft aboard ship furthered the implementation of new developments onto the smaller decked *Essex* and *Midway* classes. Wartime operations in Korea were soon to provide the hard-won experience necessary to facilitate jet operations at sea.

This tasking produced revolutionary new designs which eventually resulted in major modifications to the *Forrestal* class carrier, including steam powered catapults, angled landing area decks and improved landing aids.¹³ These changes, including the rapid "27C" modifications to the World War II *Midway* class carriers to facilitate jet aircraft

operations, led to development details of the follow-on “CVA” classes, the *Forrestal*, *Kitty Hawk* and *Enterprise*.

Even if the *United States* had not been cancelled in 1949, it would not have been deployable in time to participate in Korea. Many of its concepts, combined with the older carrier’s jet experiences, found their way into succeeding carrier class designs.

Although the B-36 didn’t make an appearance in Korea, the aircraft carriers that were to be replaced by the intercontinental bombing mission did. Their brilliant performance in the stormy seas off Korea would ensure their continued existence for decades to come.

Notes

¹ Walter Millis, ed. *The Forrestal Diaries*. p. 355

² Norman Polmar *Aircraft Carriers; a Graphic History of Carrier Aviation and its Influence on World Events*. p . 512

³ ibid. p. 502

⁴ Millis. p. 355

⁵ ibid. p. 225

⁶ Millis, *Arms and Men*, p. 325

⁷ Polmar. p. 502

⁸ ibid. p. 512

⁹ ibid. p. 513

¹⁰ Millis. *Arms and Men*. p. 325

¹¹ Polmar. p. 513

¹² Richard P. Hallion. *The Naval Air War in Korea*. p. 19

¹³ *Naval Aviation News* (January-February, 1997). *Aircraft Carriers – Yesterday, Today, Tomorrow*. p. 56

Chapter 4

Global Reach in the 1950s

The Navy is on its way out...the Air Force can do anything the Navy can nowadays.

—Secretary of Defense Louis Johnson, 1949¹

Although a long-range bomber force may be theoretically able to cross the globe in less than a day, that point is meaningless if that force fails to perform that role, regardless of the reason. Previous claims of the intercontinental bomber's ability to support operations around the world have sometimes proven to be empty due to politics, logistics or other commitments.

An early example of this resulted in the major aircraft carrier commitment employed during the Korean War. Although the Navy's aircraft carrier construction plans had just been thwarted while its World War II carrier force had been severely reduced, the few remaining *Essex* and *Midway* class carriers were immediately dispatched to Korean waters after the North Korean invasion across the 38th parallel.

When deployed Air Force assets retreated to Japan during the defense of the Pusan Perimeter, the American and British aircraft carriers were the sole remaining tactical aviation assets left in the theater. Support of the United Nation forces on the ground was left to the carrier forces until well after the Inchon landings.

The short range of Air Force fighter assets prevented any usable time over the target area in any capacity when staging from distant Japan. The dismal performance of the Air Force's new F-80—due also to the inability of the *Starfighter* to carry any bombs in the Close Air Support role—actually resulted in the *Boxer* (CV-21) setting a transpacific speed record in delivering propeller driven F-51 *Mustangs* to the beleaguered Far Eastern Air Force.² The use of these World War II fighters (previously known as the P-51) continued throughout the war, even after CAS capable jets eventually arrived in theater. The jet pilots who suddenly found themselves back in the older *Mustangs* “had seen vivid demonstrations of why the F-51 was not a ground-support fighter in the last war, and weren’t exactly intrigued by the thought of playing guinea pig to prove the same thing over again.”³

Supreme Allied Commander General Douglas MacArthur had directed that all CAS requests would be channeled through the Fifth Air Force; the situation soon grew so drastic that ground force commanders soon began pleading for support directly to Admiral Joy’s Task Force 77.⁴

Without fighter escort, the World War II-era strategic and tactical bombers based in Japan abandoned their daylight bombing because of the lack of air superiority.⁵ The much needed firepower of the Air Force’s new B-36 proved politically unwilling to prove its global reach in support of the ground war in Korea.⁶ Even improved B-29 *Superfortresses*, known as B-50s, were kept from the theater —one B-50 squadron was forced to relinquish their bombers and exchange them for old B-29s that has been in storage and suffered from chronic mechanical problems. Lamented one crewmember,

“We got the feeling that the USAF just didn’t want to waste its first-line equipment over Korea”⁷

Despite this lack of air superiority, propeller and straight-winged Navy and Marine Corps carrier aircraft dueled with the advanced, swept-winged MiG-15 while providing CAS along the front. Suffering great losses when pitted against the MiG, Naval Aviation continued to support the beleaguered ground forces until the costly victories there promoted the return of the Air Force to the Korean peninsula. America’s leadership noticed.

As a result of the aircraft carrier’s performance in the Korean War, the *Forrestal* class carrier was readily approved and funded, despite the recent cancellation of the *United States* class in 1949.⁸ President Eisenhower had been influential in his opposition to the construction of the *United States* just a few years prior.⁹ As the Supreme Commander of Allied Forces in Europe during World War II, Eisenhower had little experience with aircraft carrier warfare, probably noting little more than their usefulness in supporting invasions. After his election to the Presidency, Eisenhower apparently developed a newfound appreciation of the aircraft carrier capabilities that were supporting the ground armies in Korea.

Whether in spite of or in support of his grand “Massive Retaliation” strategy of nuclear superiority and response, Eisenhower saw the need to vastly improve the Navy’s carrier forces.¹⁰ Suddenly a major proponent of advancing carrier design, six *Forrestal* class carriers were built and the newer *Kitty Hawk* and *Enterprise* classes were approved under his administration¹¹

Notes

- ¹ Richard P. Hallion. *The Naval Air War in Korea*. pp. 21-22
- ² ibid. p. 40
- ³ ibid.
- ⁴ ibid. p. 41
- ⁵ ibid. p. 170
- ⁶ Benjamin Cooling, ed. *Case Studies in the Achievement of Air Superiority*. p. 485, also Hallion. p. 171
- ⁷ Max Hastings. *The Korean War*. p. 263
- ⁸ Norman Friedman. *U. S. Aircraft Carriers*. p. 256
- ⁹ Polmar, *Aircraft Carriers*, p. 512
- ¹⁰ Andrew F. Krepinevich, Jr. *The Army and Vietnam*. p. 17
- ¹¹ John F. Lehman. *Aircraft Carriers: the Real Choices*. p. 7

Chapter 5

Aircraft Carrier Survivability

I can't tell you where each of our carriers are with any degree of precision, but given a few moments of research at Base Ops, I can give you the coordinates of every Air Force runway, ramp and hangar worldwide.

—CDR Robert “Levi” Paredes, USN, 1996

No discussion of Air Force and Naval assets is complete without addressing the tireless issue of aircraft carrier survivability. The classic carrier proponent argument is that no aircraft carrier built during or since World War II has been sunk in combat. (A few were sunk in tests after World War II when hydrogen bombs were dropped on them while at anchor. Many ships not used, as “ground zero” in those tests remained seaworthy, if radioactive.)

Conversely, the carrier antagonist argument has been that the carrier does not have to be sunk; it merely has to be damaged to the point where it can no longer maintain flight operations.

While it is true that a “soft kill” can be obtained on most weapon systems, that in itself should not be considered grounds to invalidate that weapon’s usefulness. If that method of reasoning had been applied after the horrible losses suffered by the 8th Air Force during the 1943 Regensburg raids —later referred to as “complete failures” by General “Hap” Arnold —would we have a bomber force today?¹

Congressional research projects have evaluated the survivability of aircraft carriers; one such study was conducted in the heyday of the Cold War when the political assumption of the era was that nuclear war would be the final showdown in a “superpower” conflict. The weak conclusion was that the carrier would survive in a roundabout way; the analysis decided that carriers will readily survive small-scale battles, but are quite vulnerable to nuclear attack.²

While concluding that an aircraft carrier would not survive such an attack, it noted that no other military installation would fare any better. Unmentioned is the CVN’s capability of traveling nearly 1000 miles in a 24 hour period; poorly addressed is the fact that 90,000 tons of maneuvering, radioactivity-resisting steel is harder to locate and kill than any easily targeted hardened bunker, building or tent.

With the nuclear threat diminished today, at least as it was envisioned during the Cold War, the “Weapons of Mass Destruction” concern has shifted to chemical and biological devices. Sometimes referred to as a “poor man’s atomic bombs,” these weapons possess all the killing power of nuclear weapons with few destructive or lingering fallout-type effects.

This kind of threat also highlights the advantages of the carrier’s open sea mobility rather than the fixed latitude and longitude of installations such as the barracks previously located, before their regrettable destruction, at Khobar Towers in Saudi Arabia or in Beirut, Lebanon. Even if chemical weapons are successfully delivered in an attack against a carrier, the unique ability of the carrier to seal its hatches and secure ambient ventilation is an often-rehearsed contingency that the carrier can readily survive. External sprinkling systems then wash away residual chemicals while the carrier sails to a

clear area in preparation for the resumption of flight operations. This assumes that a threat had been able to target the underway carrier in the first place.

Remembering that no carrier has been sunk since those built before World War II, the claim that carriers receiving notable damage are unable to fight again for months while undergoing repair deserves closer scrutiny. This argument has little historical fact to support it. Allowing an analogy between modern anti-ship missile attack and World War II *Kamikaze* raids, *Essex* class carriers hit by these types weapons were often launching and recovering aircraft again in less than two hours. Of course, this was not always the case —some severely damaged carriers were out of action for months. They were able to retire from battle and conduct repair, unlike the original Air Force Base in Vietnam at Bien Hoa. When this facility was first mortared in 1964, killing servicemen and destroying aircraft, the facility remained under the threat of attack for the duration of America's participation in that war.³

The accidental flight deck fire aboard *Enterprise* in 1969 is often used as an example of aircraft carrier vulnerability. While recognizing that fire-fighting lessons learned from previous Vietnam flight deck fires were successfully employed to bring the disaster under control in less than an hour, one critic concluded that *Enterprise* was out of action for ten weeks.⁴ In fact, *Enterprise* was capable of flight operations even while the fire fighting effort was being waged. Despite the nine Mk-82 bombs that detonated on her flight deck, the catapults and arresting gear were undamaged; the debris from the disaster need only have been removed to resume flight operations.⁵ The fact that the conscious decision was made to remove the damaged *Enterprise* from the front lines should not be confused with a requirement to do so.

The contention that USAF bases and facilities cannot be damaged in the same fashion that carriers might be isn't always correct. The perception that the carrier's close quarters requirement of storing fuel and munitions will necessarily result in a degree of damage greater than the destruction that land bases would be subjected to is misguided. It has been nearly thirty years since the last major shipboard conflagration resulted in a carrier retiring from its mission. There have been many serious fires and disasters since, but modern systems and training have prevented further *Enterprise*-type disasters from recurring. The 1988 flight deck fire on *Nimitz*, for example, resulted in the loss of tens of strike aircraft, but the ship was conducting flight ops the next morning.

Non-carrier aviation assets must have airfields to operate from. America has traditionally relied upon its allies to provide forward bases for its deployed land-based forces. Recent years have found American forces "adapting" to the whims and requirements of the host nation's government. Volume 47 of *The Washington Papers, U.S. Overseas Bases: Problems Projecting American Military Power Abroad*, addresses the loss of overseas installations that continues to this day. Obviously dated, recommendations are made to move the base at then-troubled Bahrain to then-friendly Iran's Bandar Abbas port facility⁶. Also showcased is the long-term relationship enjoyed with the American installations in the Philippines. No one was ready to guess that Iran was about to turn on its allies or that our tenure in Subic Bay was soon to be short-lived.

Both of these examples clearly demonstrate how unpredictable the politically shifting winds of today's allies can be. From the loss of the airbase in Tripoli in the past to today's uncertain future of our slowly disintegrating facilities in Saudi Arabia, the argument against our dependency on foreign lands to project power from strengthens

daily. The death and destruction from the Beirut and Khobar Towers barracks bombings require the addressal of land-based vulnerabilities to terrorist attack through conventional, biological or chemical weaponry. The political issue of peacetime loss of American lives on foreign soil is a heartfelt sensitivity today with American involvement in ever escalating UN peacekeeping missions worldwide. U.S. military establishments in foreign lands —and in America as well - will always be vulnerable to terrorist attack. No amounts of concertina wire or good intentions will prevent that. It would be easier to deliver a WMD-laden Domino's Pizza truck to the Pentagon than it is to deliver the same device to an aircraft carrier underway in the open ocean.

Hundreds of “non-combat” casualties have been suffered in recent decades - none have occurred aboard aircraft carriers as a result of terrorism or the political will of others.

Notes

¹ Edward Jablonski. *Flying Fortress*. pp. 131 - 133

² Alva A. Bowen. *Aircraft Carrier Survivability: the Influence of Size*. p. 23

³ Krepinevich. p. 97

⁴ William F. Hughes, *The Unique Vulnerabilities of the Aircraft Carrier*. p. 41

⁵ Bowen. p. 3

⁶ Alvin J. Cottrell, Thomas H. Moorer. *U. S. Overseas Bases: Problems Projecting American Military Power Abroad*. p. 60

Chapter 6

Aircraft Carrier Adaptability

It is essential that we most efficiently plan to use the remaining resources entrusted by American citizens as forces are downsized...joint warfare is team warfare.

—General John M. Shalikashvili, Chairman of the Joint Chiefs of Staff¹

Aircraft Carriers: The Real Choices was a policy paper written by future Secretary of the Navy John Lehman and published in 1978 for the Center for Strategic and International Studies. His point of view is Navy-biased; this attitude and knowledge were key credentials in his selection to serve President Reagan in the 1980's. Although written when the nation's key threat was perceived to be the Soviet Union, many of Lehman's arguments still apply to today. Long before the Department of the Navy developed its post-Cold War mission of "littoral" power projection, Lehman addresses this type of mission in support of a NATO war deep inside Europe.²

Lehman also addresses the issue of building carriers for the future, although the 1970's perspective confronted entirely different issues. His dilemma in 1978 was the issue of building smaller, less capable aircraft carriers instead of more *Nimitz* class versions (this was before the fourth hull had been authorized and the lead ship had only been in service for three years). His arguments can be applied to today's CVX debate in the application of the changing and flexible assets that the large hull carrier can bring to the fight.

Changing the Peacetime Deployment of Aircraft Carriers by James D. Oliver offers ideas to improve deployment efficiency with dwindling numbers of aircraft carriers. While retaining power projection as the primary role, he argues the carrier should demonstrate increased flexibility by being able to rapidly adapt to the popular peacekeeping missions of today. Being able to support “humanitarian assistance, nation building, disaster relief, security assistance and goodwill port visits” through the embarkation of non-carrier “medical teams, Seabees, Army civil affairs units, SEAL platoons and logistic helicopters” will go far in promoting the future viability of the aircraft carrier.³

Thomas A. Cropper’s *From the sea...from the CV: Do Carriers Really Contribute to Peace Operations?* makes a similar argument while encouraging the expansion of tactical missions from the carrier. These are missions that the carrier can support to some degree with currently deployed technology, but would be greatly improved through increased emphasis.

Areas that Cropper wants to improve include “psychological operations, night observation, photo-reconnaissance, degraded weather force protection and minimum lethality weapons.”⁴ For example, the capability now exists to link the carrier’s television studio through carrier aircraft and broadcast directly into a region requiring influence.

The ability of the aircraft carrier to adapt to support other services has already been addressed. From the World War II transfer of aircraft from American factories to the battlefield, through the *Boxer’s* delivery of previously thought obsolescent aircraft to Japan based Air Force squadrons during the Korean War, to the *America* and

Eisenhower's role as Army helicopter transports in Operation Restore Democracy, the carrier has provided a joint asset with a flexibility that no other service could duplicate. The weeks required to support this type of strategic transport are far outweighed by the limitations and task saturation levels currently suffered by our air transportation capabilities.

Notes

¹ Joint Publications 1 and 5-0. *Joint Warfare of the Armed Forces of the United States and Doctrine for Planning Joint Operations*. cover pages

² Lehman. p. 32

³ James D. Oliver,. *Changing the Peacetime Deployment of Aircraft Carriers*. p. 19

⁴ Thomas A. Cropper. *From the sea...from the CV: Do Carriers Really Contribute to Peace Operations?* p. ii

Chapter 7

Conclusions

In conclusion, an historical argument for the continued development and employment of the modern aircraft carrier exists.

Much is made today of the theory of power projection across the globe from the United States; this unproven concept is yet again being offered as a replacement to the time proven capabilities of the carrier fleet. Little is said of these same promises having been historically broken, despite having both global and regional assets available for that mission.

Regardless, this theory offers little in the politically vital spectrum of forward presence. A Stealth bomber in an environmentally controlled hangar far from the public eye does not offer the political credibility or provide for a demonstration of national will in troubled areas on the other side of the planet. Only an aircraft carrier battle group conducting day and night flight operations off an adversary's coast can provide this sort of presence.

Historical examples of the hundreds of times that the carrier has performed this mission make a strong case for this argument. The Great White Fleet did not impress emerging Japan while it sat pier side in Norfolk. The victorious naval armada sitting at anchor in Tokyo Bay in 1945 remains an internationally unforgettable sight to this day.

Every president since World War II has used aircraft carrier battle groups to maintain or regain the peace. No president has ever called upon the independent use of a bomber force to project power outside times of war; this force has only been employed when in concert with other forces.

The facts behind the failure of the U.S.S. *United States* to survive the political gauntlet should be absorbed and applied to prevent this fate from repeating itself with the CVX concept. The actual argumentative points made in 1949 were valid, but political events and misconceptions superceded them. The fact that the super carrier concept was validated in the following months should provide the required political motivation to never again repeat that mistake. The approval and funding of the *Forrestal* class by some of the very antagonists that cancelled the *United States* set a historical precedent that common sense will dictate to be difficult to overcome.

Aircraft carrier survivability remains a favorite argument used by carrier antagonists. This complaint is often heard despite the fact that no carrier has been grievously damaged in over thirty years. Modern carrier construction, fire fighting systems and damage control techniques that are being used today prove this argument far less valid than the claim of the invincibility of stationary targets.

The mobility and unpredictability of the aircraft carrier actually make its wartime survival an asset that no land based system can duplicate. The mere fact that no hostile force has inflicted damage onto an aircraft carrier in over half a century, regardless of a state of war or intent, is justification in itself for the continuation of carrier development.

Lastly, the adaptability of modern carriers must continue to grow with the ever-expanding peacekeeping missions that America routinely accepts. Whether the

requirement is for a standard carrier air wing, a wing with Army or Marine helicopters added or a futuristic asset, carriers must continue to develop new roles by constantly demonstrating their flexibility regardless of the situation.

Aircraft carriers have survived to this date because of the contribution they have historically made in the vast majority of America's conflicts. Whether supplying air power to a theater commander, forcing deterrence through forward presence, evacuating hostages of terrorism or disaster or by using its evolving internal assets on peacekeeping missions, the aircraft carrier continues to provide flexible solutions to America's overseas problems.

Glossary

AVT	Training Aircraft Carrier, previously used for carrier qualifying naval aviators.
CAS	Close Air Support
CNO	Chief of Naval Operations.
CONUS	Continental United States.
CV	Conventional powered Aircraft Carrier as currently designated by the U.S. Navy.
CVA	Designation no longer used to denote large hull Attack Aircraft Carriers developed after World War II. Some speculate the "A" is for Atomic following the B-36 controversy, but this is not the official definition.
CVB	Battle Aircraft Carrier, specifically the <i>Midway</i> class. Initially applied to the <i>United States</i> and <i>Forrestal</i> classes, they were eventually redesignated CVA
CVB-X	Initial designation of the never built CVA-58, the U.S.S. <i>United States</i> .
CVE	Escort Aircraft Carrier; a smaller, quickly built carrier developed during World War II.
CVL	Light Aircraft Carrier; similar to CVE, both were the forerunners of the CVS and modern amphibious carriers.
CVN	Nuclear powered Aircraft Carrier as currently designated by the U.S. Navy.
CVS	Anti-Submarine Warfare Aircraft Carriers.
CVT	Training Aircraft Carrier previously used for carrier qualifying naval aviators.
CVX	Current designation of the proposed follow-on design to the U.S.S. <i>Nimitz</i> (CVN-68) class aircraft carrier. Currently, the first hull is designated CVN-77.
JFWC	Joint War Fighting Center.
JV 2010	Joint Vision 2010. A Joint Chiefs of Staff document projecting goals and providing direction for the armed services into the next century.
UN	United Nations
SAC	Strategic Air Command (sucks)

WMD

Weapon(s) of Mass Destruction

Bibliography

Aircraft Carriers —Yesterday, Today, Tomorrow. Washington: Naval Historical Center.
 Naval Aviation News (January-February, 1997).

Barlow, Jeffrey G. *Answering the Call: Carriers in Crises Response since World War II.*
 Washington: Naval Historical Center. *Naval Aviation News* (January-February,
 1997).

_____. *Revolt of the Admirals.* Washington: Naval Historical Center, 1994.

Bowen, Alva A. *Aircraft Carrier Survivability: the Influence of Size.* Congressional
Research Service. Washington DC: Library of Congress, 1982.

Chairman, Joint Chiefs of Staff. *Joint Vision 2010 —Concept for Future Joint
Operations.* Washington: Government Printing Office, 1997

Cooling, Benjamin, ed. *Case Studies in the Achievement of Air Superiority.* Washington:
 Center for Air Force History, 1994

Cottrell, Alvin J., Thomas H. Moorer. *U. S. Overseas Bases: Problems Projecting
American Military Power Abroad.* Beverly Hills, CA: Sage Publications, 1978 (for
the Center for Strategic and International Studies as volume 47 of *The Washington
Papers*).

Cropper, Thomas A. *From the sea...from the CV: Do Carriers Really Contribute to
Peace Operations?* Newport, RI, 1995.

Davis, Jacquelyn K. *Aircraft Carriers and the Role of Naval Power in the Twenty-First
Century.* Cambridge, Mass.: Institute for Foreign Policy Analysis, 1993.

Deaton, Bill. *Setting a Course for the Future.* Washington: Naval Historical Center.
 Naval Aviation News (January-February, 1997).

Durham, James M. *Carrier TACAIR 2010.* Newport, RI, 1991.

Friedman, Norman. *U. S. Aircraft Carriers.* Annapolis: Naval Institute Press, 1983.

Hallion, Richard P. *The Naval Air War in Korea.* Baltimore: The Nautical & Aviation
 Publishing Company of America, 1986.

Hastings, Max. *The Korean War.* New York: Touchstone, 1987

Hoyt, Edwin P. *Carrier Wars: Naval Aviation from World War II to the Persian Gulf.*
 New York: McGraw-Hill, 1989.

Hughes, William F. *The Unique Vulnerabilities of the Aircraft Carrier.* Montgomery,
 AL, 1974.

Jablonski, Edward. *Flying Fortress.* New York: Doubleday & Company, 1965

Johnson, Robert F. *Carriers are Forward Presence.* *Proceedings* (August 1996).
 Annapolis, MD: Naval Institute Press.

_____. *Carriers are Forward Presence.* Washington: Naval Historical Center. *Naval
Aviation News* (January-February, 1997).

Joint Publications 1 and 5-0. *Joint Warfare of the Armed Forces of the United States and Doctrine for Planning Joint Operations*. Washington: Government Printing Office, 1995

Krepinevich, Jr., Andrew F. *The Army and Vietnam*. Baltimore: The John Hopkins University Press, 1986

Lehman, John F. *Aircraft Carriers: the Real Choices*. Beverly Hills, CA: Sage Publications, 1978 (for the Center for Strategic and International Studies as volume 52 of *The Washington Papers*).

MacDonald, Scot. *Evolution of Aircraft Carriers*. Monograph, Washington: Naval Historical Center, 1964.

Myers, Gene. *Bomber Debates*. *Proceedings* (August 1996). Annapolis, MD: Naval Institute Press.

Millis, Walter, ed. *The Forrestal Diaries*. New York: Viking Press, 1951.

_____. *Arms and Men*. New York: Putnam, 1956.

Oliver, James D. *Changing the Peacetime Deployment of Aircraft Carriers*. Newport, RI, 1993.

O'Rourke, Ronald. *Navy Carrier Aircraft in the 1990s: Implications of a 12-Carrier Fleet*. Washington: Congressional Research Service, 1990.

Polmar, Norman. *Aircraft Carriers; a Graphic History of Carrier Aviation and its Influence on World Events*. Garden City, NY: Doubleday & Company, 1969.

_____. *The Naval Institute Guide to the Ships and Aircraft of the U. S. fleet*. 16th edition. Annapolis: Naval Institute Press, 1997.

Vanderberg, Mark T. *Responding to Crises in the New World Order*. Washington: Naval Historical Center. *Naval Aviation News* (January-February, 1997).

Wooldridge, E.T., ed. *Into the Jet Age*. Ed. Annapolis, MD: Naval Institute Press, 1995.

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